

The opinion in support of the decision being entered today was  
not written for publication and is not binding precedent  
of the Board

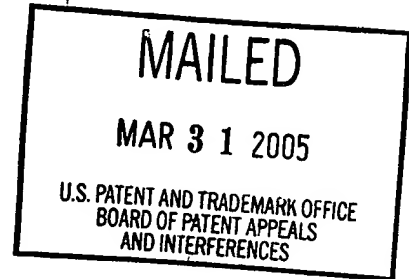
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

Ex parte KARL A. LITTAU,  
CHILIANG L. CHEN and  
ANAND VASUDEV

Appeal No. 2005-0517  
Application 08/893,917

ON BRIEF



Before KRATZ, JEFFREY T. SMITH, and PAWLIKOWSKI, Administrative Patent Judges.

PAWLIKOWSKI, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1-21. Claims 8-15 and 16-20 are at issue in this appeal. A copy of claims 8 and 16 is set forth in the attached appendix. We consider claims 8 and 16 in this appeal. 37 CFR § 1.192(c)(7)(2003).

As a preliminary matter, we note that a decision was mailed on January 3, 2004 (Appeal No. 2001-2067), wherein we affirmed the 35 U.S.C. § 102(b) rejection of claims 1-7 and 21 as being anticipated by Moslehi. In that decision, we also requested that the examiner conduct (with regard to the 35 U.S.C. § 102(b) rejection of claims 8-15 as being anticipated by Moslehi), a means-plus-function analysis of claims 8-15, and also conduct a means-plus-function analysis of claims 16-20 (with regard to the 35 U.S.C. § 103 rejection of Moslehi in view of Stevens). In

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response, the examiner provided such analysis in the examiner's supplemental answer mailed April 17, 2003.

In response to the examiner's supplemental answer mailed on April 17, 2003, appellants filed a supplemental reply brief on June 20, 2003. We then remanded the application to the examiner to clarify the record with regard to certain pending rejections.

In response to this remand, in another supplemental examiner's answer, mailed April 1, 2004, the examiner indicated that any rejection involving the reference of Kawamura has been withdrawn. Appellants responded to this supplemental answer by filing a supplemental reply brief on June 3, 2004.

Hence, the remaining rejections in this case are set forth below:

I. Claims 8-15 stand rejected under 35 U.S.C. §102(b) as being anticipated by Moslehi.<sup>1</sup>

II. Claims 16-20 stand rejected under 35 U.S.C. § 103 as being obvious over Moslehi in view of Stevens.

The examiner relies upon the following references as evidence of unpatentability:

Stevens et al. (Stevens)	5,302,803	Apr. 12, 1994
Moslehi	5,403,434	Apr. 4, 1995

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<sup>1</sup>The rejection of claims 1-7 and 21 as being anticipated by Moslehi has been affirmed in our decision mailed January 3, 2004 (Appeal No. 2001-

We have carefully reviewed appellants' appeal brief, appellants' reply brief, and each of appellants' supplemental reply briefs (one was filed on June 20, 2003 and the other was filed on June 3, 2004). We have also carefully reviewed the examiner's answer, and each of the supplemental examiner's answers (one mailed April 17, 2003, and another mailed on April 1, 2004, respectively). This review has led us to conclude that the examiner's rejections, of the claims now before us, are not sustainable.

#### OPINION

##### I. The anticipation rejection of claims 8-15

We refer to pages 2-7 of the examiner's supplemental examiner's answer filed on April 17, 2003 with regard to the examiner's position for this rejection.

In response thereto, appellants filed a supplemental reply brief on June 3, 2004. In the paragraph bridging pages 1-2 of this supplemental reply brief, appellants argue that their apparatus differs from the apparatus in Moslehi because Moslehi's apparatus does not disclose means (322), in fluid communication with means for forming a flow of said reactive radicals (304), and with means for forming a diluent gas flow (326), for mixing said flow of said reactive radicals (304) and said diluent gas flow (326) downstream of means for forming a plasma (306), and anterior to the chamber (15), to form a gas-radical mixture. See appellants' Figure 3.

The examiner states that Moslehi teaches a mixing manifold "discharge tube" (24). See page 4 of the supplemental answer mailed April 17, 2003. This is depicted in Figure 1 of Moslehi. The examiner states that this discharge tube (24) teaches an equivalent function of mixing reactive radicals and diluent gas

flow. We disagree. The material that enters this discharge tube (24) is the material that is exiting discharge cavity (28) shown in Figure 1 of Moslehi. The material that exits discharge cavity is in the form of a plasma. See column 9, lines 6-10. Therefore, mixing of a nonplasma material and a plasma material is not conducted in the discharge tube (24). Hence, discharge tube 28 is not an equivalent means to appellants' means for mixing (322) to form a gas-radical mixture.<sup>2</sup>

Accordingly, we reverse the anticipation rejection of claims 8-15 as being anticipated by Moslehi.

II. The 35 U.S.C. § 103 rejection of claims 16-20

We refer to pages 9-11 of the examiner's supplemental examiner's answer mailed April 1, 2004 with regard to the examiner's position for this rejection.

Appellants argue that the examiner does not provide an explanation as to why one skilled in the art would have incorporated the part (arrestor) of the Stevens apparatus into the apparatus of Moslehi, nor does the examiner explain how such an incorporation would have been done. See each of appellants' supplemental reply briefs. Appellants also argue that Stevens does not disclose the microwave arrester as claimed. Appellants state that Stevens discloses a dummy load 46 connected to a magic-T 38 as shown in Figure 2. Appellants state that, in contrast, independent claim 16 recites an applicator having an

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<sup>2</sup>With regard to method claim 1, we note that method claim 1 is broader than this aspect of apparatus claim 8 because the location at which the mixing step is conducted as recited in claim 1, is not limited to being downstream of the means for forming a plasma. As such, we explained how discharge cavity (28) operated so as to suggest the subject matter of claim 1. See our decision mailed January 30, 2003, pages 5-8. Discharge cavity (28) is not located downstream of the means of forming a plasma because discharge cavity 28 is part of the means for forming a plasma in Moslehi. See column 9, lines 6-10 and Figure 1.

input aperture and an output aperture, each of which is equipped with microwave arresters. Appellants assert that there is no teaching as to how the dummy load 46 in Stevens can be incorporated into the apparatus of Moslehi, to provide microwave arresters at input and output apertures, as recited in claim 16. Supplemental reply brief filed June 20, 2003, page 3.

It is true that the examiner does not discuss, with any detail, how to incorporate the arrester of Stevens into the apparatus of Moslehi, to arrive at the apparatus as set forth in claim 16, that includes an applicator having an input aperture, and an output aperture, each of which is equipped with a microwave arrester. Nor does the examiner explain how Stevens suggests to use two arresters, each positioned at an input and output aperture of an applicator.

We therefore reverse the rejection of claims 16-20 under 35 U.S.C. § 103 as being obvious over Moslehi in view of Stevens.

### III. Conclusion

The rejection of claims 8-15 under 35 U.S.C. § 102(b) as being anticipated by Moslehi is **reversed**. However, we note that, as mentioned, supra, we **affirmed** this rejection with respect to claims 1-7 and 21, in our decision mailed on January 3, 2004.<sup>3</sup>

The rejection of claims 16-20 under 35 U.S.C. § 103 as being obvious over Moslehi in view of Stevens is **reversed**.

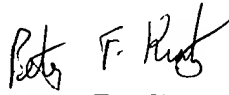
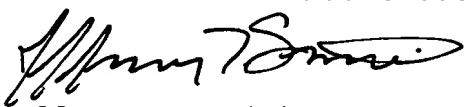

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<sup>3</sup> We also note that in our decision mailed January 3, 2004, we reversed a rejection of claims 1-4, 6, and 21 under 35 U.S.C. § 102(b) as being anticipated by Kawamura, and the examiner withdrew the rejection of claims 8, 9, and 11-15 under 35 U.S.C. § 102(b) as being anticipated by Kawamura as indicated in the supplemental examiner's answer mailed on April 1, 2004.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (effective Sept. 13, 2003; 69 Fed. Reg. 49960 (Aug. 12, 2004); 1286 Off. Gaz. Pat., Office 21 (Sept. 7, 2004)).

AFFIRMED-IN-PART

  
Peter F. Kratz )  
Administrative Patent Judge )  
  
Jeffrey T. Smith )  
Administrative Patent Judge )  
  
Beverly A. Pawlikowski )  
Administrative Patent Judge )

BOARD OF PATENT  
APPEALS AND  
INTERFERENCES

BAP/cam

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APPLIED MATERIALS, INC.  
2881 Scott Blvd., M/S 2061  
Santa Clara, CA 95050

APPENDIX

8. A substrate processing apparatus having a process chamber, said apparatus, comprising:

means for forming a plasma remotely with respect to said chamber, said plasma including a plurality of reactive radicals;

means, in fluid communication with said means for forming a plasma, for forming a flow of said reactive radicals traversing toward said chamber;

means for forming a nonplasma diluent gas flow;

means, in fluid communication with said means for forming a flow of said reactive radicals and with said means for forming a diluent gas flow, for mixing said flow of said reactive radicals and said diluent gas flow downstream of said means for forming a plasma and anterior to said chamber to form a gas-radical mixture; and

means, in fluid communication with said means for mixing, for flowing said gas-radical mixture into said chamber.

16. A substrate processing apparatus, comprising:

a processing chamber having an intake port;

a supply of nonplasma diluent gas;

a plasma source for generating a plasma consisting of a reactive radicals, said plasma source including a conductive plasma applicator defining an internal volume, said applicator having an input aperture and an output aperture, each of which is equipped with microwave arrestors;

a mixing manifold having multiple inlets and an outlet with said outlet being coupled to said intake port and one of said inlets being in fluid communication with said outlet aperture of said conductive plasma applicator, with the remaining inlets being in fluid communication with said supply of diluent gas;

a pump system, in fluid communication with both said plasma source and said supply of diluent gas, to create a diluent gas flow and a flow of said reactive radicals, with said flow of said



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reactive radicals traversing said output aperture toward said mixing manifold and said flow of gas traveling from said supply to said mixing manifold, with said diluent gas flow and said flow of said reactive radicals combining when traveling between said inlets and said outlet forming a gas-radical mixture egressing from said outlet and traversing through said intake port;

a controller configured to regulate said pump system and said plasma source; and

a memory, coupled to said controller, comprising a computer-readable medium having a computer-readable program embodied therein for directing operation of said substrate processing system, said computer-readable program including a set of computer instructions to be operated on by said controller to regulate the introduction of said radicals from said plasma into said mixing manifold, said set of computer instructions including:

a first subroutine to be operated on by said controller to regulate said pump system to introduce said reactive radicals into said mixing manifold at a first rate and said diluent gas at a second rate so as to maintain a pressure with said chamber less than one torr.